Claims

1. A method for decoding video data comprising:

receiving a video signal, the video signal including two or more threads, each thread including a plurality of frames of video data corresponding to a periodic interval of the video signal, and each thread including a motion vector for each one of the plurality of frames that relates current image data to previously received reference image data;

calculating a motion vector for a virtual thread of video data based upon one or more motion vectors from one or more of the two or more threads;

generating an estimated frame of the virtual thread by applying the motion vector for the virtual thread to a previous frame of the virtual thread; and

providing the estimated frame of the virtual thread and an earlier frame of one of the two or more threads of the video signal to a filter, the filter providing as an output a new frame of the virtual thread.

2. The method of claim 1 further comprising displaying the virtual thread.

3. The method of claim 1 wherein the filter weights pixels from the earlier frame and the estimated frame according to a weight value to provide the new frame, the weight value selected so that an error function for the new frame is below a predetermined threshold.

4. The method of claim 3 wherein the error function is evaluated by summing, for one or more pixels of the virtual thread, a difference between a pixel value for the one of the one or more pixels of the virtual thread and a corresponding pixel value for one of the two or more threads.

5. The method of claim 3 wherein the predetermined threshold is proportional to at least one of a quantization value, a number of pixels in a block of the virtual thread, or a tuning parameter.

6. The method of claim 1 wherein the video signal relates to a video conference.

7. A method comprising:

receiving a first block of pixel values representing a portion of an image;

receiving a second block of pixel values, the second block of pixel values representing estimated new values for the first block of pixels; and

generating a third block of pixels by combining weighted values from the first block of pixel values and the second block of pixel values by applying a weight that is varied according to motion within the second block of pixel values.

8. The method of claim 7 wherein the weight is determined by selecting a value for the weight, generating a possible block of pixels with the selected weight, and using the possible block of pixels as the third block of pixels if an error function is below a predetermined threshold.

9. The method of claim 8 wherein the error function is evaluated by summing a difference between each pixel of the third block of pixels and a corresponding pixel of the first block of pixels.

10. The method of claim 7 wherein the first block of pixel values are decoded from a multi-threaded video stream.

11. The method of claim 7 wherein the second block of pixel values are obtained by applying motion vectors decoded from a multi-thread video stream to a previous block of pixel values of a virtual thread derived from the multi-threaded video stream.

12. A method comprising:

receiving a first block of pixels, the first block of pixels being from a multi-threaded video signal and corresponding to a region of an image;

receiving a second block of pixels, the second block of pixels corresponding to estimated values for the region of the image; and

applying the first block of pixels and the second block of pixels to a filter, the filter generating a third block of pixels according to a weight, the weight determining a contribution of a pixel of the first block of pixels and a pixel of the second block of pixels to a corresponding pixel of the third block of pixels; the weight selected so that an error function for the third block of pixels is below an error limit.

13. The method of claim 12 wherein the estimated values are determined by estimating motion vectors based upon one or more motion vectors decoded from the multi-threaded video signal, and applying the estimated motion vectors to a virtual thread output by the filter.

14. The method of claim 12 wherein the error function is evaluated by:

selecting a value for the weight;

applying the first block of pixels and the second block of pixels to the filter;

obtaining the third block of pixels;

for each pixel of the region of the image, calculating a difference between a corresponding pixel from the third block of pixels and a corresponding pixel from the first block of pixels; and

summing the differences.

15. The method of claim 12 wherein the error limit is evaluated by determining a product of a quantization value, a number of pixels, and a tuning parameter, the quantization value being decoded from a thread of the multi-threaded video, the number of pixels being the number of pixels in the region of the image, and the tuning parameter providing control over a sensitivity of the filter.

16. A system comprising:

a video conferencing terminal, the video conferencing terminal configured to receive multi-threaded video data;

a decoder in the video conferencing terminal that decodes the multi-threaded video data into a plurality of threads of video; and

a filter in the video conferencing terminal that generates a virtual thread of video data for display by variably weighting data for the virtual thread between data derived from prior values for the virtual thread and new data from the plurality of threads of video.

17. The system of claim 16 wherein the data derived from prior values for the virtual thread is obtained by calculating estimated motion vectors based upon motion vectors decoded from the multi-threaded video data, and applying the estimated motion vectors to prior data for the virtual thread.

18. The system of claim 16 wherein the video conferencing terminal is an H.263-compliant terminal.

19. A system comprising:

receiving means for receiving multi-threaded video data;

decoding means for decoding the multi-threaded video data into a plurality of threads of video; and

filtering means for generating a virtual thread of video data for display by variably weighting data for the virtual thread between data derived from prior values for the virtual thread and new data from the plurality of threads of video.

20. The system of claim 19 further comprising a display means for displaying the virtual thread.

21. A computer program product for processing multi-threaded video data comprising:

computer executable code for receiving a first block of pixels, the first block of pixels being from a multi-threaded video signal and corresponding to a region of an image;

computer executable code for receiving a second block of pixels, the second block of pixels corresponding to estimated values for the region of the image; and

computer executable code for filtering the first block of pixels and the second block of pixels by applying the first block of pixels and the second block of pixels to a filter, the filter generating a third block of pixels according to a weight, the weight determining a contribution of a pixel of the first block of pixels and a pixel of the second block of pixels to a corresponding pixel of the third block of pixels; and the weight selected so that an error function for the third block of pixels is below an error limit.